

AMENDMENTS TO THE CLAIMS

1-62. (Canceled)

63. (New) An interbody spinal implant made of cortical bone for insertion at least in part into an implantation space formed across the height of a disc space between adjacent vertebral bodies of a human spine, the vertebral bodies having an anterior aspect and a posterior aspect, said implant comprising:

a leading end for insertion first into the disc space, a trailing end opposite said leading end, said implant having a length along a mid-longitudinal axis of said implant from said leading end to said trailing end;

opposed upper and lower portions between said leading and trailing ends adapted to be placed at least in part within and across the height of the disc space to contact and support the adjacent vertebral bodies, said upper and lower portions being non-arcuate along at least a portion of the length of said implant;

an interior facing side, an exterior facing side opposite said interior side, and a maximum width therebetween, said maximum width of said implant being less than approximately one-half of the width of the adjacent vertebral bodies into which said implant is adapted to be inserted, said interior and exterior sides connecting said upper and lower portions and said leading and trailing ends, said leading end having a generally straight portion from side to side, said interior side forming a corner with said generally straight portion of said leading end, said interior side adapted to be oriented toward an interior side of another implant when inserted within the disc space;

said implant being manufactured from a bone ring obtained from a major long bone of a human having a medullary canal, said interior side of said implant including at least a portion of the medullary canal so that when said implant is placed side by side another implant having an interior side including at least a portion of a medullary canal a passage is formed adapted to hold bone growth promoting material for permitting for the growth of bone from vertebral body to vertebral body through said passage.

64. (New) The implant of claim 63, wherein said straight portion of said leading end is generally oriented at 90 degrees to the mid-longitudinal axis of said implant.

65. (New) The implant of claim 63, wherein at least a portion of said leading end has a reduced height to facilitate insertion of said implant between the two adjacent vertebral bodies.

66. (New) The implant of claim 63, wherein said trailing end is at least in part straight from side to side.

67. (New) The implant of claim 63, wherein said trailing end is asymmetrical side to side.

68. (New) The implant of claim 63, wherein said at least one of said interior and exterior sides is at least in part straight.

69. (New) The implant of claim 63, wherein at least one of said interior and exterior sides is at least in part oriented generally parallel to the mid-longitudinal axis of said implant.

70. (New) The implant of claim 63, wherein said interior and exterior sides are at least in part generally parallel one another.

71. (New) The implant of claim 63, wherein at least a portion of said upper and lower surfaces are in an angular relationship to each other from trailing end to leading end for allowing angulation of the adjacent vertebral bodies relative to each other.

72. (New) The implant of claim 63, wherein said implant has a maximum length less than and approximating the posterior to anterior depth of the vertebral bodies.

73. (New) The implant of claim 63, further comprising a bone engaging surface formed on the exterior of at least said upper and lower portions for engaging the adjacent vertebral bodies, said bone engaging surface including at least one of a protrusion, a ratchet, a spike, a spline, surface roughenings, and knurling.

74. (New) The implant of claim 63, wherein said implant comprises at least in part of a bone growth promoting material.

75. (New) The implant of claim 74, wherein said bone growth promoting material is selected from one of bone, bone derived products, demineralized bone matrix, mineralizing proteins, ossifying proteins, bone morphogenetic protein, and hydroxyapatite.

76. (New) The implant of claim 63, in combination with a bone growth promoting material.

77. (New) The implant of claim 76, wherein said bone growth promoting material is selected from one of bone, bone derived products, demineralized bone matrix, mineralizing proteins, ossifying proteins, bone morphogenetic protein, and hydroxyapatite.

78. (New) The implant of claim 63, wherein said implant is treated with a bone growth promoting substance.

79. (New) The implant of claim 63, wherein said implant is at least in part resorbable.

80. (New) The implant of claim 63, wherein at least a portion of said implant is treated to promote bone ingrowth between said implant and said adjacent vertebral bodies.

81. (New) The implant of claim 63, further in combination with at least one spinal fixation implant.

82. (New) An interbody spinal implant made of bone composite material for insertion at least in part into an implantation space formed across the height of a disc space between adjacent vertebral bodies of a human spine, the vertebral bodies having an anterior aspect and a posterior aspect, said implant comprising:

a leading end for insertion first into the disc space, a trailing end opposite said leading end, said implant having a length along a mid-longitudinal axis of said implant from said leading end to said trailing end; opposed upper and lower portions between said leading and trailing ends adapted to be placed within the disc space to contact and support the adjacent vertebral bodies, said upper and lower portions being non-arcuate along at least a portion of the length of said implant;

an interior side, an exterior side opposite said interior side, and a maximum width therebetween, said maximum width of said implant being less than approximately one-half of the width of the adjacent vertebral bodies into which said implant is adapted to be inserted, said interior and exterior sides connecting said upper and lower portions and said leading and trailing ends, said leading end having a generally straight portion from side to side, said interior side forming a corner with said generally straight portion of said leading end, said interior side adapted to be oriented toward an interior side of another implant when inserted within the disc space;

said implant being manufactured from a bone composite material, said interior side of said implant including a recess so that when said implant is placed side by side another implant having an interior side including a recess a passage is formed adapted to hold bone growth promoting material for permitting for the growth of bone from vertebral body to vertebral body through said passage.

83. (New) The implant of claim 82, wherein said bone composite material includes at least one of cortical bone fibers, bone filaments, bone particles and bone dust.

84. (New) The implant of claim 82, further comprising a binding material.

85. (New) The implant of claim 84, wherein said binding material is at least one of bioactive and bioresorbable.

86. (New) The implant of claim 82, wherein said straight portion of said leading end is generally oriented at 90 degrees to the mid-longitudinal axis of said implant.

87. (New) The implant of claim 82, wherein at least a portion of said leading end has a reduced height to facilitate insertion of said implant between the two adjacent vertebral bodies.

88. (New) The implant of claim 82, wherein said trailing end is at least in part straight from side to side.

89. (New) The implant of claim 82, wherein said trailing end is asymmetrical side to side.

90. (New) The implant of claim 82, wherein said at least one of said interior and exterior sides is at least in part straight.

91. (New) The implant of claim 82, wherein at least one of said interior and exterior sides is at least in part oriented generally parallel to the mid-longitudinal axis of said implant.

92. (New) The implant of claim 82, wherein said interior and exterior sides are at least in part generally parallel one another.

93. (New) The implant of claim 82, wherein at least a portion of said upper and lower surfaces are in an angular relationship to each other from trailing end to leading end for allowing angulation of the adjacent vertebral bodies relative to each other.

94. (New) The implant of claim 82, wherein said upper and lower surfaces include at least one opening in communication with one another to permit for the growth of bone from vertebral body to vertebral body through said implant.

95. (New) The implant of claim 82, wherein said implant has a maximum length less than and approximating the posterior to anterior depth of the vertebral bodies.

96. (New) The implant of claim 82, further comprising a bone engaging surface formed on the exterior of at least said upper and lower portions for engaging the adjacent vertebral bodies, said bone engaging surface including at least one of a protrusion, a ratchet, a spike, a spline, surface roughenings, and knurling.

97. (New) The implant of claim 82, wherein said implant comprises at least in part of a bone growth promoting material.

98. (New) The implant of claim 97, wherein said bone growth promoting material is selected from one of bone, bone derived products, demineralized bone matrix, mineralizing proteins, ossifying proteins, bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

99. (New) The implant of claim 82, in combination with a bone growth promoting material.

100. (New) The implant of claim 99, wherein said bone growth promoting material is selected from one of bone, bone derived products, demineralized bone matrix, mineralizing proteins, ossifying proteins, bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

101. (New) The implant of claim 82, wherein said implant is treated with a bone growth promoting substance.

102. (New) The implant of claim 82, wherein said implant is at least in part resorbable.

103. (New) The implant of claim 82, wherein at least a portion of said implant is treated to promote bone ingrowth between said implant and said adjacent vertebral bodies.

104. (New) The implant of claim 82, further in combination with at least one spinal fixation implant.

105. (New) A pair of interbody spinal implants made of a bone composite material for insertion at least in part across the height of a disc space between adjacent vertebral bodies of a human spine, the vertebral bodies having an anterior aspect, a posterior aspect, and a depth therebetween, each of said implants comprising:

a leading end for insertion first into the disc space, a trailing end opposite said leading end, said implant having a length along a mid-longitudinal axis of said implant from said leading end to said trailing end, said length of said implant being greater than one half the depth of the vertebral bodies adjacent the disc space into which said implant is adapted to be inserted;

opposed upper and lower portions between said leading and trailing ends adapted to be placed at least in part within and across the height of the disc space to contact and support the adjacent vertebral bodies, said upper and lower portions being non-arcuate along at least a portion of the length of said implant;

an interior side, an exterior side opposite said interior side, and a maximum width therebetween, said maximum width of said implant being less than approximately one-half of the width of the adjacent vertebral bodies into which said implant is adapted to be inserted, said interior and exterior sides connecting said upper and lower portions and said leading and trailing ends, said leading end being asymmetrical from side to side, said interior side adapted to be oriented toward an interior side of another implant when inserted within the disc space; and

said implant being manufactured from a bone composite material, said interior side of said implant including a recess, said interior side of said implant including a recess so that when said implant is placed side by side another implant having an interior side including a recess a passage is formed adapted to hold bone growth promoting material for permitting for the growth of bone from vertebral body to vertebral body through said passage; and the combined width of said pair of said implants being greater than one half the width of the adjacent vertebral bodies into which said implants are adapted to be inserted.

106. (New) The implant of claim 105, wherein said bone composite material includes at least one of cortical bone fibers, bone filaments, bone particles and bone dust.

107. (New) The implant of claim 105, further comprising a binding material.

108. (New) The implant of claim 105, wherein said binding material is at least one of bioactive and bioresorbable.

109. (New) The implant of claim 105, wherein said leading end includes a generally straight portion from side to side.

110. (New) The implant of claim 105, wherein said straight portion of said leading end is generally oriented at 90 degrees to the mid-longitudinal axis of said implant.

111. (New) The implant of claim 105, wherein at least a portion of said leading end has a reduced height to facilitate insertion of said implant between the two adjacent vertebral bodies.

112. (New) The implant of claim 105, wherein said trailing end is at least in part straight from side to side.

113. (New) The implant of claim 105, wherein said trailing end is configured in the shape of a half circle from side to side.

114. (New) The implant of claim 105, wherein said trailing end is asymmetrical side to side.

115. (New) The implant of claim 105, wherein the trailing end is adapted to conform from side to side to at least a portion of the peripheral contour of at least one of the anterior and posterior aspects of the vertebral bodies adjacent a disc space into which said implant is inserted.

116. (New) The implant of claim 105, wherein said at least one of said interior and exterior sides is at least in part straight.

117. (New) The implant of claim 105, wherein at least one of said interior and exterior sides is at least in part oriented generally parallel to the mid-longitudinal axis of said implant.

118. (New) The implant of claim 105, wherein said interior and exterior sides are at least in part generally parallel one another.

119. (New) The implant of claim 105, wherein at least a portion of said upper and lower surfaces are in an angular relationship to each other from trailing end to leading end for allowing angulation of the adjacent vertebral bodies relative to each other.

120. (New) The implant of claim 105, wherein said upper and lower surfaces include at least one opening in communication with one another to permit for the growth of bone from vertebral body to vertebral body through said implant.

121. (New) The implant of claim 105, wherein said implant has a maximum length less than and approximating the posterior to anterior depth of the vertebral bodies.

122. (New) The implant of claim 105, further comprising a bone engaging surface formed on the exterior of at least said upper and lower portions for engaging the adjacent vertebral bodies, said bone engaging surface including at least one of a protrusion, a ratchet, a spike, a spline, surface roughenings, and knurling.

123. (New) The implant of claim 105, wherein said implant comprises at least in part of a bone growth promoting material.

124. (New) The implant of claim 123, wherein said bone growth promoting material is selected from one of bone, bone derived products, demineralized bone matrix, mineralizing

proteins, ossifying proteins, bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

125. (New) The implant of claim 105, in combination with a bone growth promoting material.

126. (New) The implant of claim 125, wherein said bone growth promoting material is selected from one of bone, bone derived products, demineralized bone matrix, mineralizing proteins, ossifying proteins, bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

127. (New) The implant of claim 105, wherein said implant is treated with a bone growth promoting substance.

128. (New) The implant of claim 105, wherein said implant is at least in part resorbable.

129. (New) The implant of claim 105, in combination with a chemical substance adapted to inhibit scar formation.

130. (New) The implant of claim 105, in combination with an antimicrobial material.

131. (New) The implant of claim 105, wherein at least a portion of said implant is treated to promote bone ingrowth between said implant and said adjacent vertebral bodies.

132. (New) The implant of claim 105, further in combination with at least one spinal fixation implant.